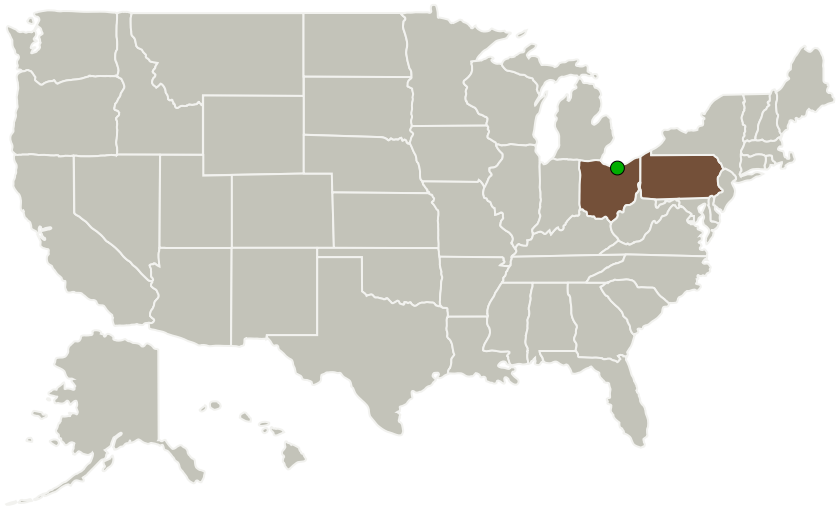
Titanium-Water Heat Pipe Radiator for Spacecraft Fission Power, Phase II

Completed Technology Project (2015 - 2018)

Project Introduction

In this SBIR Phase II program Advanced Cooling Technologies, Inc. (ACT) proposes to develop titanium/water heat pipes suitable for Spacecraft Fission Power applications. NASA is currently examining small fission power reactors design, such as the Kilopower, which aims to provide roughly 1 kW of electric power. Kilopower plans to use titanium/water heat pipes to remove the waste heat from the cold end of the convertors. Previous water heat pipe designs for space fission power are not suitable, since they cannot operated in a vertical orientation, which is necessary for ground testing of Kilopower. The overall objective of the Phase I and II programs is to develop a titanium/water heat pipe radiator suitable for Spacecraft Fission Power, such as Kilopower. To meet this objective, the following items must be achieved: demonstrate the ability to transport heat over a long distance from the Stirling cold end to the radiator, design and fabricate a heat pipe radiator for integration into the Kilopower system and identify the best wick design for the varied operating conditions of the Kilopower system. The principle objective of the Phase II project will be to develop full-scale titanium water heat pipes that will be suitable for testing in the Kilopower demonstration unit.

Primary U.S. Work Locations and Key Partners



Titanium-Water Heat Pipe Radiator for Spacecraft Fission Power, Phase II

Table of Contents

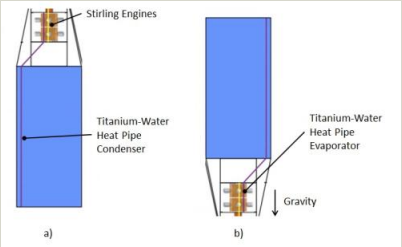
Titanium-Water Heat Pipe Radiator for Spacecraft Fission Power, Phase II

Completed Technology Project (2015 - 2018)

Organizations Performing Work	Role	Type	Location
Advanced Cooling Technologies, Inc.	Lead Organization	Industry	Lancaster, Pennsylvania
Glenn Research Center(GRC)	Supporting Organization	NASA Center	Cleveland, Ohio

Primary U.S. Work Locations	
Ohio	Pennsylvania

Images



Briefing Chart
Titanium-Water Heat Pipe Radiator for Spacecraft Fission Power Briefing Chart *(https://techport.nasa.gov/image/126432)*

Organizational Responsibility

Responsible Mission Directorate:
Space Technology Mission Directorate (STMD)

Lead Organization:
Advanced Cooling Technologies, Inc.

Responsible Program:
Small Business Innovation Research/Small Business Tech Transfer

Project Management

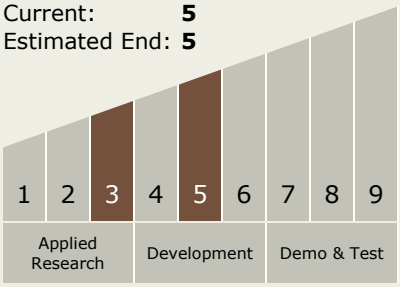
Program Director:
Jason L Kessler

Program Manager:
Carlos Torrez

Principal Investigator:
Mohammed Ababneh

Technology Maturity (TRL)

Start: **3**
Current: **5**
Estimated End: **5**



Titanium-Water Heat Pipe Radiator for Spacecraft Fission Power, Phase II

Completed Technology Project (2015 - 2018)

Technology Areas

Primary:

- TX03 Aerospace Power and Energy Storage
  - TX03.1 Power Generation and Energy Conversion
    - TX03.1.4 Dynamic Energy Conversion

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System